Airports Authority of India

Directorate of Information Technology

Safdarjung Airport, Delhi-110003

No. AAI/CHQ/ITD/Project/2023

Date: 09.02.2023

Budgetary Quote

for

SITC of Mobile APP and Dashboard for C-ATFM

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1. Call for Budgetary Quotes

1.1. Budgetary quotes are invited from bidders for "**SITC of Mobile APP and Dashboard for C-ATFM**", in a phased manner as per para 14 of this document.

2. Introduction:

2.1. Airports Authority of India ("Authority"), established under the Airports Authority of India Act, 1994 ("Act") is a Category-I Mini-Ratna Public Sector Enterprise. The Authority is mandated under the Act, inter-alia, to manage the airports, civil enclaves, and aeronautical communication stations efficiently (other than airports and airfields belonging to, or subject to the control of, any armed force of the Union).

2.2. The Authority in its persistent efforts to provide world-class infrastructure and services to its stakeholders has been endeavoring to excel over its global peers by undertaking various initiatives. Further to improve the functioning of the Authority to meet the changing economic scenario in general and of the Civil Aviation Sector in particular, to meet growing Air Traffic demand, to facilitate efficient airport operations to meet the scale of passenger travel and to ensure optimum utilization of airport resources. In this regard, AAI wants to explore possibilities of a mobile application where CTOT data could be shared automatically as and when updated in the system and analyze the ATFM specific parameters of the historical data present in the database.

2.3. AAI has developed ATFM SKYFLOW system. System has capability of ATFM measures and generate e-mail for users for updated CTOTs/CTOs/CLDTs. It is also generating a large amount of operational data which is important for historical analysis and case study. It may be required from time to time to analyze the historical volume of traffic and to study the capacity of airspace elements. Such data is used by advanced ATFM systems around the world for enhanced prediction and creating situation awareness.

2.4. The proposed project objectives are appended below:

2.4.1. Prompt notification with suitable alert system to the user regarding application of ATFM measures.

2.4.2. Automatic and prompt distribution of updated CTOTs/CTOs/CLDTs as and when the ATFM measures are applied is also a key feature to be implemented.

2.4.3. Dashboard development to analyze historic data over web and mobile.

3. **Project Dependency**

3.1. A dedicated and Synchronized event trigger through a web API is needed from ATFM SKYFLOW as soon as CDM and ATFM measure are initiated or user request for updated CTOT/ CTO/CLDT from ATFM SKYFLOW to generate alert on user mobile application. A dedicated API must be present in ATFM SKYFLOW to get live information on the following:

3.1.1. Current list of ATFM measures applied.

3.1.2. Information contained in CDM, i.e. flight plan details of flights in the CDM along with the CTOTs/CTOs/CLDTs information

3.1.3. Key weather information such as METAR, TAF and Historic Information on CDM and ATFM measures.

3.2. Project live is dependent on life of existing ATFM SKYFLOW as the base system to get relevant information. In case the base system is changed/re-implemented as per AAI ATFM decision, the associated mobile application needs to be closed and same will be consider as end date of the project.

4. **Objective**

4.1. The submission is for budgetary purpose only. Separate tender shall be invited for award of work and participation in the Budgetary Offer is not mandatory.

4.2. For queries related to the Budgetary Quote published on the portal, bidders are advised to send clarifications (if any) through e-procurement portal only. Bid Manager Details are as below-

Name: Mr. Sandeep Kr Mittal, Senior Manager (IT)

Email: skmit@aai.aero

4.3. Closing Date for submission of Budgetary Quote Documents by Bidders given below:

Sl. No	Activity	Up to Date & Time (IST)
1.	Budgetary Quote Submission Closing Date & Time	13/02/2023, 1600 hrs.

4.4. AAI will float an open tender after obtaining budgetary quotes for project through GEM portal.

5. **Bidders Eligibility**

5.1. Bidder shall be a National / International Level IT Company in operation for the last 5 Years as on 31.03.2022 and be involved in successful development, customization and implementation of large IT based information processing and management systems.

5.2. All MSMEs related to IT domain in Mobile Development and Dashboard are also eligible.

5.3. All startups with valid DIPP number from DPIIT along with AAI start-up policy and are related to IT domain in Mobile Development and Dashboard are also eligible.

5.4. All bidder must have valid PAN and GST number.

5.5. Reselling or product/services by bidders bidding under Start-up category are not allowed.

5.5.1. Proposed solution must be innovative in nature and adequate customization/solution development to provide data security, cost efficiency, reliability and scalability must be provided by Start-up firm in their solution.

5.5.2. Hence an overview of the proposed solution in a write-up of 3000 words must be submitted to AAI for bird eye view of overall architecture, process flow, security consideration etc.

5.5.3. A Capability Assessment as per AAI Start-up Policy will be carried out by AAI for all startups who will participate in actual Tender and are not awarded work order under AAI Start-up Initiative – Innovate for Airports.

5.6. Bidder shall have implemented at least one project completed/partially completed with satisfactory services for Mobile application in both Android and iOS platform for

Central Government and/or Public Sector Undertakings (PSUs) and/or Large Private Sector Enterprises in India/Abroad in the last 3 years from the last date of bid submission of Budgetary Quote.

6. <u>Functional Requirements of Mobile Application</u>

6.1. Data exchange between the mobile app and ATFM SKYFLOW should be carried out through APIs or consuming XML files through FTP protocol only **as manually uploading CTOT information on App will defeat the purpose of expedited communication of CTOT.**

6.2. Allows prompt notification along with uniform sound notification to the user when-

  6.2.1. ATFM measures are Planned-This shall be triggered by Central Command Centre (CCC)

  6.2.2. ATFM measures are applied- This shall be triggered by SKYFLOW

  6.2.3. ATFM measures are cancelled- This shall be triggered by Central Command Centre (CCC).

  6.2.4. Operational Log register for the event trigger must be ensured.

6.3. Be Able to generate alert messages along with required data feed in mobile app for the specific users and customizable message alert to registered user as and when required. SMS Services Application/Module/Gateway to be fully integrated with the application by the vendor at no extra cost to AAI.

6.4. AAI should have facility to configure/alter/update data requirement at any stage in entire project duration.

6.5. Cost of notification and alert messages to be included in the cost of the project.

7. <u>CATFM Operational Requirement of Mobile Application</u>

7.1. Allows prompt notification with suitable alert system to the user regarding planning, application or cancellation of ATFM measures.

7.2. Automatic and prompt distribution of updated CTOTs/CTOs/CLDTs along with Customized Push Notification and PDF generation within the App according to user's profile, as and when the ATFM measures are applied.

7.3. Display list of ATFM measures applied and CTOTs/CTOs/CLDTs information with searchable fields of CDM Name, EOBD, Airline, Call sign, Aerodrome of departure and Aerodrome of arrival and allow download of execution report as per search criteria.

7.4. Show Information contained in CDM, i.e. flight plan details of flights in the CDM along with the CTOTs/CTOs/CLDTs information.

7.5. Provide a form within the App to act as slot coordination interface for requesting revised CTOT from Central Command Centre (CCC) by stakeholders and maintain downloadable record.

7.6. After the completion of ATFM measures various registered ATC, Airline, Airport operator etc. may submit their feedback and compliance report to Central Command Centre (CCC) via a form within the App and the same shall be notified to ATFM user (Downloadable).

7.7. Be user friendly and should have one touch navigation for important items such as CTOTs/CLDTs/CTOs with search feature.

7.8. Provide uploading of Files by Admin user in different formats (in PDF, DOC, Excel etc. and support Image or Short Video upload) such as ADP, Post Ops reports, training related content etc. along with audit control to fix responsibility.

7.9. Allow user to update self-profile personal information and provide data access according to individual user profile.

7.10. A free text display section on home page to allow CCC to post any other significant information.

7.11. Provide link for accessing webpage of SKYFLOW, ATFM Portal, ATFM data dashboard in mobile application itself as web view.

7.12. Display following additional information fetching directly from ATFM SKYFLOW system or ATFM mobile app to registered users for better situation awareness-
   o Key weather information such as METAR, TAF.
   o Historic Information of 90 days on CDM and ATFM measures

8. <u>Scope of Work</u>

8.1. Visualization

8.1.1. C-ATFM mobile app shall be bilingual (Hindi & English) with customizable theme (back ground color, font, look & feel etc.) for its users to run in any screen (mobile devices) resolution at both Android and iOS Mobile platform.

8.1.2. Provide AAI and ATFM logo at suitable places in the App.

8.2. User Interface

8.2.1. All icons must be crisp, clean, and distinguishable and should be as per guidelines of mobile application platform.

8.2.2. All buttons and objects must be reactive to touch and work as intended.

8.2.3. All data must be easily viewable on different Mobile platform matrix given above.

8.2.4. Apps have to be developed in English and Hindi Language.

8.2.5. The design/User Interface of the mobile application should be flexible and customizable as per AAI requirements.

8.2.6. Vendor shall take regular feedback from users to continuously upgrade the UI/UX of design aspects of mobile app (every quarter).

8.3. Software & Database management

8.3.1. Vendor can design the solution by considering Government of India's policy on adoption of open source software (MeitY vide F. No. 1(3)/2014-EG II) for mobile app development language, database, IDE / tools used for development and deployment.

8.3.2. The solution design should focus on developing workflow and business transaction, rules management, configuration management.

8.3.3. The solution must be supported by at least 'N-3' versions of any underlying products. This will be required in case some / other functionalities become non-functional upon deployment on the latest version, or in case a roll-back is required.

8.3.4. Database as opted by vendor must be audit trail enabled.

8.3.5. Mobile app listing and updates roll out at google play store and App store for iOS is in the scope of the vendor.

8.3.6. The bidder shall provide upgrades/patches etc. required for the same without any additional cost.

8.3.7. Vendor has to perform periodical indexing or performance fine tuning to ensure quick response of mobile app.

8.3.8. Solution should provide detailed report as spreadsheet, XML, PDF and HTML format, customizable as per the requirement of AAI and comparable to previous assessment.

8.3.9. Mobile application must provide option to interface with any other external system and exchange data through API as per AAI requirement.

8.3.10. In case there is a need to purchase COTS (Commercial-off-the-Shelf) license, the same shall be perpetual license in the name of AAI.

8.3.11. Vendor needs to provide configuration, customization and installation reports to AAI. In case of any COTS products, the vendor should follow disciplined approach (as per the best practice defined by the OEM) for configuration and customization which should not restrict AAI for any future upgrades to its solution.

8.3.12. It is declared that any source code shared with AAI shall be used only for the purpose of the project or non-commercial use only. Hence, proprietary products may be accepted in case source code is shared for any proposed proprietary product. The final call for acceptance is with AAI.

8.3.13. Vendor should ensure that new versions of services should be backward compatible with at least three previous versions so that users of the service can start using new version of the service without mandatorily making changes to their code.

8.4. Integration Requirements

8.4.1. The mobile application needs to integrate and inter-operate with various other external entities, therefore, the app should easily and in a relatively seamless manner integrate with external entities like SKYFLOW/ ATFM web portal.

8.4.2. Real-Time Integration with any other external interface as per AAI requirement.

8.4.3. The mobile application should have the ability to manage various services and systems effectively with its minimum to zero impact on other services.

8.4.4. The Mobile App should have the ability to upgrade services / add new services and mode to access these services effectively in a cost-effective manner without affecting other services with a commitment for backward compatibility as per the policy guidelines of that mobile platform.

8.4.5. ATFM data integrity/safety to be ensured while fetching the data from C-ATFM System and ATFM operation should not be affected in any way.

8.5. Security Requirements

Security audit to be conducted for every year by Indian Computer Emergency Response Team (CERT-IN or ICERT) empaneled vendors for the entire duration of the contract. Following must be ensured by the vendor:

8.5.1. Vendor should adhere Information Technology Act 2000 (revised 2008) (http://www.meity.gov.in/content/informationtechnology- act).

8.5.2. Vendor should adhere CERT-In security guidelines for Indian Government websites (http://www.cert-in.org.in/).

8.5.3. Vendor should adhere E-SAFE Guidelines for Information Security (http://egovstandards.gov.in/).

8.5.4. Both the initial security audit report and final security audit report by CERT-IN empaneled vendors to be submitted to AAI.

8.5.5. Conducting annual security audits and Compliance of the Security recommendations specified by the CERT-IN empaneled vendor are in the scope of the vendor.

8.5.6. Obtaining final security audit report by CERT-IN empaneled vendors is also in the scope of the vendor.

8.5.7. Security Audit by CERT-IN empaneled vendors and compliance to the recommendations during security audit before launching of the mobile app (1st year) are in the scope of the vendor.

8.5.8. Application must be modular and scalable along with ensuring cyber security measures as per AAI Information Security Management Systems (ISMS) policy. Cyber security of this mobile app to be ensured with best practices of mobile app development, few best practices to be complied are enlisted as follows:

8.5.8.1. Write a secure code: Obfuscate and minify code so it cannot be reverse engineered.

8.5.8.2. Encrypt all data.

8.5.8.3. Be extra cautious with libraries: When using third-party libraries, be doubly careful and test the code thoroughly before using it in mobile app.

8.5.8.4. Use authorized APIs only: For example, caching authorization information locally helps programmers easily reuse that information when making API calls. However, it also gives attackers a loophole through which they can hijack privileges.

8.5.8.5. Use High-Level Authentication: Multi-factor authentication with a combination of static password and dynamic OTP shall be used. Biometric authentication like fingerprints shall be used as an alternative.

8.5.8.6. Deploy Tamper-Detection Technologies.

8.5.8.7. Use the Principle of Least Privilege: The principle of least privilege dictates that a code should run with only the permissions it absolutely needs and no more. Mobile app shouldn't request for any more privileges than the minimum required for it to install and to function.

8.5.8.8. Deploy Proper Session Handling: "Sessions" on mobile last much longer than on desktops. This makes session handling harder for the server. Use tokens instead of device identifiers to identify a session. Tokens can be revoked at any time, making them more secure in case of lost and stolen devices. Enable remote wiping of data from a lost/stolen device and also enable remote log-off.

8.5.8.9. Use the Best Cryptography Tools and Techniques: Key management is crucial to ensure better encryption. Never hard code keys as that makes it easy for attackers to steal them. Store keys in secure containers and don't store them locally on the device. Use the latest, most trusted APIs, such as 256-bit AES encryption with SHA-256 for hashing.

8.5.8.10. Test Repeatedly: Penetration testing, threat modelling, and usage of emulators to continuously test mobile app for vulnerabilities. Fix them with each update and issue patches when required.

8.6. Dashboard Requirements

8.6.1. ATFM is planning to develop a centralized, interactive means of monitoring, measuring, analyzing, and extracting relevant insights from different datasets in key areas while displaying information in an interactive, intuitive, and visual way. Business intelligence solutions for ATFM shall combine business analytics, data mining, data visualization, data tools and infrastructure, and best practices to help organizations make more data-driven decisions.

8.6.2. The vendor shall provide services to integrate the proposed Dashboard system with existing IT applications, defining security architecture of solution, supply and deploy the entire setup which would be inclusive of the software, all required tools for the installation of the application and associated support services, etc.

8.6.3. Scope of work for implementation of Dashboard shall include the following:

    8.6.3.1. Supply, Installation, Implementation, Integration, Training and Operation of Dashboard system.

    8.6.3.2. Operations and Maintenance of Dashboard system with24x7 support.

8.6.4. Dashboards must be interactive, user friendly and must possess the ability to drill-down to the deepest dimension possible.

8.6.5. Dashboards must be fully hosted online, and only authenticated users must be able to access the content. It shall extract and use real-time data from ATFM-SKYFLOW/Other system directly without any manual intervention.

8.6.6. Allow the user to save any customization done on a visual element.

8.6.7. All visual elements shall have editable titles, labels, legends, axes, icons, and colors etc. where applicable.

8.6.8. Data visualization can be provided using bar graphs, pie -chart and other relevant charts with cross filtering based on CALL SIGN, ADEP, ADES, Air Route, Date, duration, region-wise (Northern, Easter, Western, Southern), airline and performance category etc: Other relevant customization and display control shall be user configurable.

8.6.9. Different types of charts should be supported such as Bar Charts, Histograms, Line Charts, Heat Maps, Pie Charts, Grids, Radar Charts, Scatter Plots, and Doughnut Charts etc. Have the ability to display dashboards and reports using different visual elements including charts, maps, calendars, gauges, images, tables, visual and textual lists, and alerts

8.6.10. Data exchange is critical to CDM as participants in the decision-making process must have the information necessary to make decisions consistent with the objectives sought. Common situational awareness is key to collaborative decision-making for ATFM. It will allow partners throughout the aviation value chain to access key performance indicators and help in informed decision-making.

8.6.11. Key areas for consideration and feature to be implemented are as mentioned below (details of any other considerations and sub-features within the below core considerations and features other than this will be discussed during the requirements phase):

8.6.11.1. User Experience

8.6.11.1.1. Organized Navigation

8.6.11.1.2. Superior User Experience

8.6.11.2. Content Management System

8.6.11.2.1. Content Design and Regulation

8.6.11.2.2. Content Search

8.6.11.2.3. Content Revision and Management

8.6.11.3. Feedback and Sharing System

8.6.11.3.1. Information Sharing (social media, email, blogs, forum etc.)

8.6.11.3.2. Feedback System

8.6.11.3.3. Print friendly

8.6.11.4. Dashboard Integration with CATFM website

8.6.11.5. User Management

8.6.11.5.1. The admin should be able to manage the overall content of the dashboard and also should have the option to edit/ delete content.

8.6.11.5.2. The administrator should be able to create users as per the requirement and assign necessary permissions to update/delete/modify the content.

8.7. ATFM Reports

8.7.1. Preparation of various reports for tracking the efficiency of the system based on ATFM data using a Business Intelligence tool. Generate hourly/daily/ weekly/ monthly/annual reports:

8.7.2. Interactive Reports with multiple filters viz. Airline wise, Airport wise, FIR region wise (North/East/West/South), Operations type (Scheduled/Non-scheduled/Military/General Aviation), Aircraft type and wake turbulence category, Flight rule type (lFR/VFR/Both(Y&Z)). etc where ever applicable including but not limited to following parameters:

8.7.2.1. Aircraft Movement data (Arrival/Departure/ /Overflying/ Total flight movement data with respect to type of filter criteria applied by the user)

8.7.2.2. Busiest city pair data (Arrival/Departure/Total flight movement data with respect to type of filter criteria applied by the user)

8.7.2.3. International/Domestic/overflying movement (Arrival/Departure/Overflying / Total flight movement (East and West Bound) data with respect to type of filter criteria applied by the user).

8.7.2.4. Total no. of Non-Scheduled traffic to any airport in India (arrival and/or departure).

8.7.2.5. Total no. of Military flights to any airport in India (arrival and/or departure).

8.7.2.6. ATFM measures statistics-compliance rate.

8.7.2.7. Fuel saving and reduction in carbon emission.

8.7.2.8. Comparison and forecast, Year on Year, Month on Month, Week on week etc.

8.7.2.9. Delay-Air delay, Ground delay.

8.7.2.10. Missing Departure 'DEP'/Arrival 'ARR' messages with filter criteria.

8.7.2.11. Slot adherence (such as SOBT, EOBT, CTOT, CTO, ELDT etc) with respect to the adherence window (variable parameter) applied by the user.

8.7.2.12. Route usage data (CDR, PBN etc) (Total flight movement data with respect to type of filter criteria applied by the user){For example, few data are available in different fields of filed Flight Plan such as:

8.7.2.12.1. Field 8-Rule of Flight & Type of Flight,

8.7.2.12.2. Field 9- Aircraft Type,

8.7.2.12.3. Field 13-Departure Aerodrome,

8.7.2.12.4. Field 15-Cruise Speed, Level & Route of flight (CDR and PBN routes data),

8.7.2.12.5. Field 16-Destination Aerodrome, Total EET, etc.}

8.7.2.13. The users should have the ability to save reports as well as export to MS Excel, pdf, csv and other required formats.

8.7.2.14. The various reports, dashboards, etc should be accessible from mobile devices like smart phones, Tablet PCs, etc.

8.7.2.15. Report may be derived from multiple databases or multiple tables or both.

8.7.2.16. Dashboard shall allow reconfiguration of Key performance indices(KPIs)-such as addition, deletion or insertion as and when required.

8.7.2.17. Extraction of desired reports with variable parameters as per user requirement.

8.7.2.18. Some of the sample reporting KPIs are as follows:

8.7.2.18.1. Provide quality indicators by means of issuance of the following delay reports [accounted in hours and minutes)

8.7.2.18.2. total daily delays for all flights

8.7.2.18.3. total daily delays per airline

8.7.2.18.4. total delays per delays generators (airspace sector or aerodrome)

8.7.2.18.5. total delays per FIR;

8.7.2.19. Calculate the Actual Taxi-Out Time value as equal to Actual Take Off Time minus Actual Off-Block Time: AXOT= ATOT - AOBT.

8.7.2.20. Calculate the Actual Taxi-ln Time value as equal to Actual In-Block Time minus Actual Landing Time: AXIT= AIBT - ALDT.

8.7.2.21. Report to compare FPL, Repetitive Flight Plan (RPL) and Flight Schedule (FS).

8.8. System Deployment and Hosting

8.8.1. Vendor will be responsible for the application developed overall irrespective of the method adopted (develop application from scratch or redirecting the website as mobile view).

8.8.2. During development and testing, vendor has to install and publish mobile app on his own server with internet connectivity.

8.8.3. Testing to be done jointly by vendor and AAI. Mobile app considered to be ready only after satisfactory testing by AAI.

8.8.4. After successful development, testing and final security audit report with compliance of all security audit recommendations – mobile app & database to be deployed in a virtual machine at AAI Datacenter at Safdarjung Airport as DC and Hyderabad Datacenter as DR.

8.8.5. Mobile App Delivery should be in the form of a published mobile application on each platform in the market place (Google Play store, Apple App store) and will be under the AAI accounts of these stores. No additional payments shall be made to vendor for publishing of mobile application.

9. Details of Dashboard:

9.1. The dashboard will be a web-based tool which will have the capability to scale based on the number of airports to be considered during the project tenure.

9.2. Role based customized access as per user Department can be facilitated.

9.3. The tool should enable users to easily decipher the patterns and relationships in the data via statistical graphs, plots and infographics

9.4. Dashboards should be interactive, easy to use, and available with custom filters.

9.5. Provide for rich visualizations and graphics. Structure the overall content to make it screen reader friendly.

9.6. The system should generate graphs/charts etc. comprising of complex dynamics and multiple parameters from historic data.

9.7. It should also allow flexibility to users to customize reports by creating beautiful visualizations—all from the same intuitive interface and without the need to switch between different products for different types of analysis.

9.8. User Management - The admin should be able to manage the overall content of the dashboard and also should have the option to edit/ delete contents. The administrator should be able to create users as per the requirement and assign necessary permissions to update/delete/modify the content.

9.9. In a real-time environment, it must detect anomalies and notify the appropriate individuals or trigger alerts in operational dashboards.

9.10. The System should have the ability to manage different types of alerts based on thresholds, priority and frequency for alert generation.

9.11. It should provide for slice—dice and drag and drop features.

9.12. Integration with e-Mail Messaging Solution: Dashboard system shall use this system for notifications and AAI user mail-based report forwarding.

9.13. Graphical and tabular data along with analysis tools on performance trends and dependencies. The granular data up to Range level to be made available.

9.14. System should automatically reject gibberish transactions, for example transaction with missing In time-Out time entries etc but should maintain a septate log record for each airport for each day for entire project duration.

10.Data Sharing and Analytics

Dashboard must have warehouse and data archive capability with online analytical processing (OLAP) capabilities, which includes providing, a multi-dimensional and subject oriented view of the database needs to be created. This integrated repository of ATFM data from all integrated airports and will hold data in AAI Data Centre for 180 days before archiving it. The main features of the data warehouse need to include:

(a) User friendly interface   (d) Secured web access

(b) Dynamic / pull down menus   (e) Bulletin board

(c) Search based Report   (f) Complete Metadata

11. Operational U of Mobile Application

11.1. Scenario 1 - ATFM measures are planned or cancelled)

When ATFM measures are planned or cancelled ATFM user shall notify all the users via push notification and also display a ticker on home screen of the App. This text of the message shall be customizable by ATFM user.

11.2. Scenario 2 - ATFM measures are applied

When ATFM measures have been applied in ATFM system SKYFLOW, notification shall be sent to all the users via push notification and also display a ticker on home screen of the App. This text of the message shall be customizable by ATFM user. This notification shall be user profile specific i.e. if any airline or airport profile has been selected by the user then they will get notification for their selected airport and airline.

11.3. Scenario 3 - Distribution and fetching of CTOTs/CTOs/CLDTs data

The App shall send messages containing CTOTs/CTOs/CLDTs information of relevant flights according to user profile after application of ATFM measures. The CTOT/CTO information shall be available in App for quick viewing with applicable

filters of Call-sign, Departure and destination aerodrome, Flight information regions etc.

11.4. Scenario 4 - Revised CTOTs/CTOs/CLDTs requested/ issued

The registered airline users may send request for a revised CTOTs/CTOs/CLDTs from CCC using the APP and ATFM user shall receive notification on such request. Also, ATFM user may enter the revised CTOT as requested and the same shall also be notified to the user.

11.5. Scenario 5 - Compliance report/Feedback

ATC users may submit the reasons for non-compliances which shall be compiled archived for future reference After the completion of ATFM measures various registered ATC, Airline, Airport operator etc may also submit their feedback to CCC via the App and the same shall be notified to ATFM user. The feedback received shall be compiled and archived for future reference

11.6. Scenario 6 -ADP, AUP, UUP, reports to be shared

ATFM user shall post in App various documents in PDF, DOC, Excel or other formats for viewing and download by the user. The list of the documents may be ADP, AUP, UUP, post ops reports, execution report etc.

11.7. Scenario 7 - Update profile information

The user may need to update contact information in the mobile application or change password. Also, option to contact ATFM shall be available.

11.8. Scenario 8 - Display of any significant banner on home screen

ATFM user may need to display any significant image or video on home screen such as any weather image or defence exercise, awareness message etc. This may be

changed time to time as per ATFM requirement and should be user friendly for ATFM users.

11.9. Scenario 9- Additional ATFM related information

The App shall provide options to fetch and display additional ATFM related information from ATFM system such as METAR, TAF and previous CDM data.

12. <u>KPIs for the ATFM dashboard</u>

12.1. Dashboard shall display:

12.1.1. Departure punctuality (airport specific data)

12.1.2. Arrival punctuality (airport specific data)

12.1.3. Airport peak capacity (airport specific data

12.1.4. Arrival Delay (airport specific data)

12.1.5. Departure Delay (airport specific data)

12.2. Departure:

12.2.1. Plot hourly the number of departures based on both ETOT (Predicted Departure demand) & ATOT (Actual departure).

12.2.2. Departure Demand: Count of the number of departures based on ETOT.

12.2.3. Declared Capacity: as declared for the Airport.

12.2.4. Departure Throughput: Count of number of actual departures based on ATOT.

12.2.5. Peak departure rate (preferably depicted in a different colour) count of the highest actual departures captured per hour.

12.2.6. Departure Delay calculated as ATOT-ETOT and CTOT-ETOT (during the period when ATFM measures were applied from the CDM prepared).

12.2.7. Average departure delay per hour calculated based on ATOT.

12.2.8. Sum of total departure delay for each flight divide by the number of actual departures in that hour (or the number of delayed departures per hour as per user input).

12.2.9. Departure Tolerance calculated as follows:

12.2.9.1. Early: (ATOT-ETOT) $\geq$-VSP minutes

12.2.9.2. On time: (ATOT- ETOT) = VSP to + VSP minutes

12.2.9.3. Late: (ATOT- ETOT) $\geq$+ VSP minutes

12.3. Arrival

12.3.1. Plot hourly the number of arrivals based on both ELDT (Arrival Demand) & ALDT.

12.3.2. After the flight is captured as Airborne calculate the flights ELDT as follows:

ELDT= ATOT + FPL EET

12.3.3. Arrival Demand: Count of the number of landings based on ELDT

12.3.4. Declared AAR

12.3.5. Arrival Throughput: Count of number of actual landings based on ALDT

12.3.6. Peak Arrival rate (preferably depicted in a different color) highest count of the number of actual arrivals captured per hour.

12.3.7. Arrival Delay=AET- FPL EET, where AET is ALDT-ATOT

12.3.8. Average Arrival delay per hour can be calculated based on ALDTs, sum of total arrival delay for each flight divide by the number of actual arrivals in that hour (or the number of delayed arrivals per hour as per user input).

12.3.9. Arrival tolerance calculated as

12.3.9.1. Early: (ALDT-ELDT) $\geq$ -VSP minutes

12.3.9.2. On time: (ALDT- ELDT) = - VSP to + VSP minutes

12.3.9.3. Late: (ALDT- ELDT) $\geq$ + VSP minutes

13. <u>GO-LIVE and Acceptance Criteria</u>

Project Monitoring committee (PMC) or agency as nominated by AAI will carry out User Acceptance Test, System Acceptance Test and /or Certification to ensure that the implementation meets all the requirements including but not limited to processes, standards, specifications, and performance as detailed in the SoW (Scope of Work).

Once "Certificate of System Acceptance" is provided to Service Provider by AAI PMC, it will consider Go-Live of the Dashboard.

14. Project Tenure & Payment Terms

The project needs to be developed within in 4 months from the award of the work. Project will be in maintenance for two years from Date of Go-Live of application. AMC of project will include maintenance of mobile application at all platform along with changes suggested by AAI in both dashboard and mobile application. Hosting, data retrieval, report generation, database maintenance will be in scope of the bidder. **In case of uncompleted activity/ portion, 0.5% per week for the related work will be recovered as liquidated damages on base cost within the entire project duration.** Bidder needs to provide budgetary quote as per format mentioned in Annexure-A. All the payments shall be made by IT Dte to bidder after deducting all taxes including TDS, as per laid down provisions from time to time. All the payment shall be in Indian Rupees. The detailed payment terms are given below. IT Dte will release the payment after receiving the invoice on completion of the phase / period. The table below indicates the key deliverables/milestones and payment terms –

Sl. No.	Key Milestones	Timelines	Payment Terms
	Date of Award of Work as **T**		
1	Presentation of design options of the Mobile & Dash Board including the visual look, functionalities, features, data analytics, content management etc.	T1 = T + 2 Weeks	NIL
2	Formal Approval by AAI Project management Committee for the design of the Mobile & Dashboard Application	T2 = T1 + 1 Weeks	10% of the total cost indicated in the Financial Proposal
3	Formal approval of the following: • Launch of Beta Version of the Mobile • Prototype of Dash Board • API integration with SKYFLOW. • Security Audit from NICSI / CERT empaneled agencies & Load testing.	T3 = T2 + 8 Weeks	40% of the total cost indicated in the Financial Proposal

4	Formal approval of the following: • Launch of Mobile application on Android and iOS platform. • Acceptance of Dashboard	T4 = T3 + 1 Weeks	10% of the total cost indicated in the Financial Proposal
5	Regular maintenance, content management and smooth operations of the Mobile and Dashboard	T5 = T4 + 24 Months	30 % of the total cost be p aid after a s equal quarterly instalments.
6	Handing o v e r t h e Mobile & D a s h Board maintenance and operations	T6 = T5 + 1 Weeks	10% of the total cost indicated in the Financial Proposal

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<u>**Annexure-A**</u>

Budgetary Quote Submission Form
(Required on Bidder's letter head)

To,   [Location, Date]

The Chief Information Officer,

Airports Authority of India

Hangar Building, Safdarjung Airport, Delhi-110003

Subject: Budgetary quote for project "**SITC of Mobile APP and Dashboard for C-ATFM"**

Dear Sir/Madam,

We, the undersigned, offer to provide the services for the above in accordance with your Technical Specification dated _____, and our quote.

Our attached Budgetary Offer is for the price of INR_____[Amount in words and figures].

<u>**Bill of Material (BOQ)**</u>

S No.	Description	UOM	Qty (I)	Unit Rate in INR Excluding GST (II)	GST in % indicative (III)	Total Amount in INR Excluding GST (IV) = (II) + (III)
1	Mobile Application Development on Android and iOS along with Security Audit from NICSI / CERT empaneled agencies, Load testing and hosting at respective platforms.	Lot	1			
2	Dashboard Development & Reporting	Lot	1			
3	AMC cost of 1st Year	Lot	1			

4	AMC cost of 2nd Year	Lot	1			
	Grand Total					

AUTHORIZED SIGNATURE _____

NAME OF THE SIGNATORY _____

NAME & ADDRESS OF THE TENDERER